

Remarks

Claims 1-26 are pending in the application. Claims 8, 9 and 14 are currently amended.

Claims 1-7, 10-13, 16-19, and 21-26 have been cancelled.

While Applicants believe that the claims submitted in the Request for Continuing Examination are patentable, Applicants nonetheless propose the current amendments to the claims in order to more clearly distinguish over the cited art. Claims 8 and 14 are currently amended by including limitations from dependent claims, which have in turn been cancelled.

Response to Examiner's objection to claim 8

In the office action of May 28, 2004, Examiner objected to claim 8, requiring that "first" be changed to "second." Applicants have made the required change.

Response to Examiner's rejection of claims 9, 11, and 13 under 35 U.S.C. § 112

Examiner rejected claims 9, 11, and 13, stating that there is insufficient antecedent basis for the limitation "metallic lines." Applicants have made appropriate corrections, and respectfully request that the rejection be withdrawn.

Response to Examiner's rejections under 35 U.S.C. § 103(a)

Examiner rejected claims 8, 9, 11, and 13 under 35 U.S.C. § 103(a) as being unpatentable over Gupta, et al. (2002/0163072) in view of Barth, et al. (2003/0003703) and Forouhi, et al. (2003/0053081). Examiner separately rejected claims 10, 14, 15, 17, and 19-20 under 103(a) as being unpatentable over Gupta in view of Barth and Forouhi, in further view of Desai, et al. (US-5,656,554).

Applicants respectfully assert that the rejections under 103(a) were improper, and further assert that currently amended claim 8 is patentable over the cited art. Applicants traverse the rejections and respectfully request that they be withdrawn. The requirements for making a *prima facie* case of obviousness 35 U.S.C. § 103(a) are well established in the law. The Patent Office requires that the Examiner comply by following Section 2143 of the Manual of Patent Examining Procedure. MPEP 2143 requires that the Examiner support such rejections by showing that the cited patents teach all the claim limitations, and by showing how the cited patents make a suggestion to combine them. Applicants respectfully assert that no *prima facie* case of obviousness has been made because the Examiner failed to show a suggestion to combine the cited publications. Furthermore, the current amendments to claim 8 further distinguish over the cited publications.

Applicants note that each of the rejected claims depended directly from an independent claim. Thus, Examiner's rejections of each dependent claim dealt only with the limitations of the respective dependent claims plus the limitations of the independent claim.

Claim 8, as currently amended, now incorporates limitations similar to three dependent claims. Thus, the rejections applied to the rejections of the respective dependent claims, even if appropriate, which Applicants dispute, are not sufficient to render currently amended claim 8 unpatentable, since Examiner never addressed the all the limitations of currently amended claim 8.

Claim 8, as currently amended, reads:

A three-dimensional (3-D) integrated chip system, comprising:
a first wafer including one or more integrated circuit (IC) devices, a first plurality of metallic bonding pads deposited via an interlevel dielectric (ILD) for wafer-to-wafer bonding and electrical interconnection, the first plurality of metallic bonding pads having a variety of heights, and an ILD recess surrounding the first plurality of metallic bonding pads deposited via the ILD; and
a second wafer including one or more integrated circuit (IC) devices, a second plurality of metallic bonding pads deposited via an interlevel dielectric (ILD) for wafer-to-wafer bonding and electrical interconnection, the second plurality of metallic bonding pads

having a variety of heights, and an ILD recess surrounding the second first plurality of metallic bonding pads deposited via the ILD,

wherein the first plurality of metallic bonding pads is bonded to the second plurality of metallic bonding pads to establish electrical connections between active IC devices on the adjacent wafers, and

wherein the ILD is a high-temperature deformable dielectric used to allow the bonding areas to be self-leveling to facilitate the bonding of wafers having bonding pads of a variety of heights;

wherein the high-temperature deformable dielectric is SILK which exhibits a glass transition near 450°C while the metallic bonding pads exhibit a bonding temperature of about 400°C; and

wherein the ILD recesses are created by a Chemical Mechanical Polish (CMP) or by selectively etching the ILD surrounding the metallic bonding pads deposited via the ILD.

The limitations "wherein the high-temperature deformable dielectric is SILK which exhibits a glass transition near 450°C while the metallic bonding pads exhibit a bonding temperature of about 400°C," formerly in claim 13, and "wherein the ILD recesses are created by a Chemical Mechanical Polish (CMP) or by selectively etching the ILD surrounding the metallic bonding pads deposited via the ILD," formerly in claims 10 and 11, have been added to claim 8; claims 10, 11, and 13 have, in turn, been cancelled. Applicants respectfully assert that currently amended claim 8 is patentable over the cited publications.

As noted, the rejections of the respective dependent claims are not sufficient to render currently amended claim 8 unpatentable since Examiner never addressed the all the limitations of currently amended claim 8. Regarding the limitation "wherein the high-temperature deformable dielectric is SILK which exhibits a glass transition near 450°C while the metallic bonding pads exhibit a bonding temperature of about 400°C," Applicants point out that Gupta does not teach this limitation. Indeed, Examiner notes "Gupta does not disclose a high temperature deformable interlayer dielectric" (see page 4 of the Office Action). Applicants also point out that Gupta does not disclose SiLK as a dielectric.

Examiner relied on Barth to teach SiLK, since Gupta does not teach a high-temperature dielectric or SiLK. However, since currently amended claim 8 also includes the limitations from claims 10 and 11, "ILD recesses [] created by a Chemical Mechanical Polish (CMP) or by selectively etching the ILD surrounding the metallic bonding pads," the combination of Gupta and Barth is no longer appropriate. Gupta teaches selective etching using fluorine (Gupta, p. 3, pp 29), which is known to be incompatible with SiLK. Since the combination of Barth with Gupta would be, therefore, unworkable, it is does not form a proper basis for rejecting currently amended claim 8.

An analogous argument shows how Desai cannot be relied on to reject amended claim 8. Applicants note that claim 10 has been cancelled and that currently amended claim 8 contains limitations similar to cancelled claim 10. Applicants respectfully assert that Examiner's rejection of claim 10 in reliance on Desai would be improper if applied to currently amended claim 8. Examiner states Desai "disclose[s] controlling the solution of a CMP slurry wherein a surrounding dielectric material would be polished at a faster rate than a center conductive/metallic plug." However, Desai does not disclose etching a SiLK dielectric. Rather, Desai describes etching a "sacrificial layer" of "silicon dioxide from, for example, chemical vapor deposition; photoresist; polyimide; etc." Thus, the combination of Gupta, Barth, and Desai is insufficient to render currently amended claim 8 unpatentable.

Finally, Applicants note that claim 14, as currently amended, contains limitations similar to currently amended claim 8. Therefore, the arguments raised above regarding the patentability of claim 8 are considered pertinent to claim 14, and Applicants respectfully assert that claim 14 is patentable over the cited publications.

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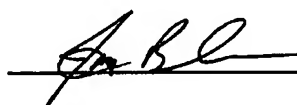
Attorney Docket: 042390.P12753

Conclusion

Applicants respectfully request that Examiner enter the claim amendments and allow the pending claims to issue. If the Examiner has any questions, Examiner is invited to contact the undersigned at (703) 633-0927.

Respectfully submitted,

Dated:

30 Aug, '04

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